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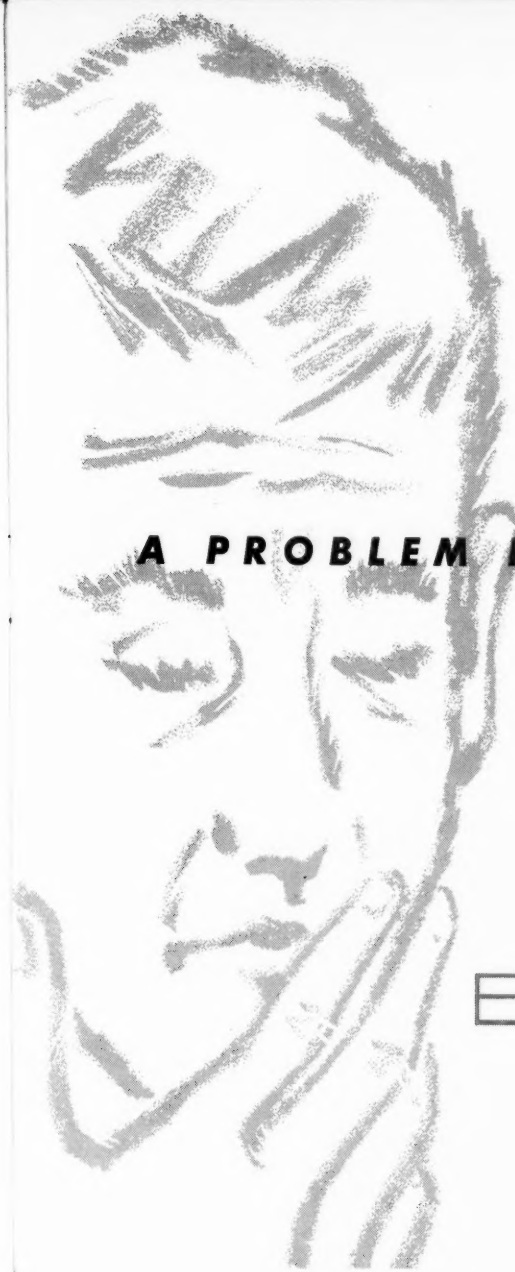
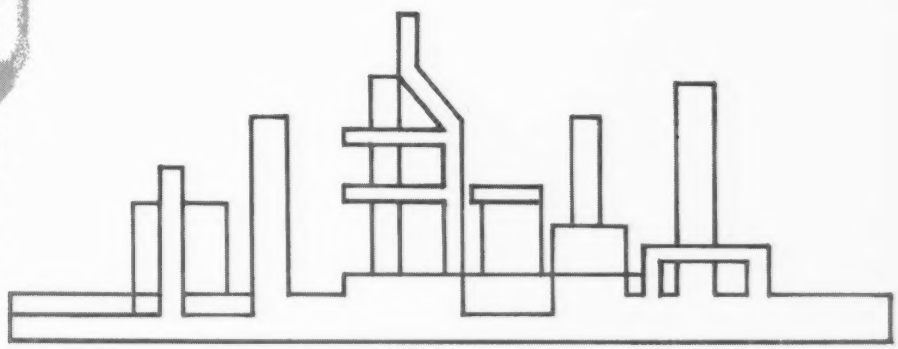
INDEX

		Page
1.	EMOTIONAL DISORDERS, A PROBLEM IN OCCUPATIONAL MEDICINE.....UDEL.....	3
2.	RADIATION AS AN INDUSTRIAL MEDICAL PROBLEM.....DUNHAM.....	8
3.	OCCUPATIONAL HEALTH (INDUSTRIAL) NURSING AS A PART OF PUBLIC HEALTH NURSING PROGRAMS.....WALKER.....	12
4.	LIVING AND WORKING WITH HEART DISEASE.....GOLDWATER.....	14



EMOTIONAL DISORDERS

A PROBLEM IN OCCUPATIONAL MEDICINE*



by
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Emotional disorders are ubiquitous and present to industry one of its most complicated medical problems. The industrial physician, like his colleague practicing in the community, recognizes that he devotes a major portion of his clinic time to a relatively small group of patients whose symptoms appear to be of emotional origin or are much modified by emotional factors. In the July, 1949, issue of Industrial Medicine, for example, W. J. Fulton reported in his job and time analysis of industrial medicine that 85 per cent of the medical services were utilized by 30 per cent of the workers whose problems were primarily emotional in character. Unlike his counterpart, however, the industrial physician has the additional responsibility of maintaining the health of the whole employee group who comprise the effective production team. In a very real sense the company is the patient. It is this added dimension of group health that makes occupational medicine alternately fascinating and frustrating.

Numerous articles appear with increasing frequency in professional and lay periodicals as evidence of concern with a variety of group problems in which emotional factors are important elements.[52-56] It is apparent from such articles that industry has a real and legitimate interest in emotional problems because of both human and economic implications. However, this has not always been the case, for industry's interest in mental hygiene is a relatively recent development.

*Reprinted with permission from the Journal of Chronic Diseases, Vol. 9, No. 2, February, 1959.

During the past 50 years, particularly in the last three decades, there have simultaneously evolved several movements that prepared a proper atmosphere in industry for the development of measures aimed at preventing emotional disorders. These movements are: (1) development of occupational health as a preventive medical discipline, (2) development of the field of human relations, and (3) development of psychiatry in the community.

During this evolution each field has contributed to the body of knowledge of the others, elucidating aspects of human behaviour. It can be seen that the practical application of psychiatric principles and techniques has not been possible until such development, and until there were in industry a recognition of the need for special help, the willingness to accept this help, and the availability of help that was appropriate.

DEVELOPMENTS IN OCCUPATIONAL MEDICINE

Goldwater has traced the historical development of occupational medicine to its present status and has indicated the problems that will demand attention in the future. He has shown that early in this century the industrial physician was primarily concerned with treating occupational injuries. In the subsequent decades, however, there was a gradual expansion in the focus of interest, so that today a medical program in industry is vastly more comprehensive and is preventive in orientation. This transition evolved in response to particular needs and as the scientists in the field developed concepts and techniques to meet these needs.

Probably the most significant factor that stimulated such development initially was the growing economic responsibility that health and welfare legislation placed upon industry. When, through workmen's compensation laws, for example, industry assumed greater financial liability for occupational injuries and illnesses, it became perfectly apparent that it was more sensible to prevent such losses than to shoulder the costs. In addition, the experiences in the two world wars demonstrated the importance of controlling environmental hazards and focused attention on the vital need of maintaining the health status of the employees if production schedules were to be met. These stimulated the needed research in clinical studies, field epidemiologic studies, and chemical and engineering techniques that culminated in the principles of environmental control personnel protection which are the basis of modern occupational medicine. In the application of these principles there were developed such techniques as selective placement, evaluation and control of environmental hazards, periodic health appraisal, prepathogenetic tests for incipient disease, diagnosis of non-occupational diseases, and health counselling and education.

Although there had been a few isolated early programs, it was not until such development that emotional disorders began to attract the attention of the industrial physician to a significant degree. Traditionally, industry had not considered this a problem of occupational origin nor of particular industrial significance. As the industrial physician applied epidemiologic techniques to his group, it soon became obvious that emotional factors were significant in a variety of considerations. In recent years there have been a multitude of reports that testify to this. For example, absenteeism, which has obvious economic implications for industry, has been shown to be related to emotional maladjustment and morale.[1-6] Alcoholism, which is also a problem in the larger community, is particularly costly because it occurs commonly among the experienced workers during their most productive years.[1-7-13] Several studies of accidents[1, 7, 14-19] have indicated the importance of emotional conflicts as predisposing factors in their occurrence. Similarly, problems relating to disability evaluation and rehabilitation,[1, 2, 20-22, 39] the older employee,[1, 23-25] and turnover[27, 37-38] in industry require an appreciation of the emotional factors involved for their proper management. Then, too, as the workmen's compensation schedule was expanded and the interpretation of compensation laws liberalized, the functional aspects of impairment became more important. The economic and human losses manifested in these problems are impossible to calculate. But they have stimulated the industrial physician and the management he counsels to inquire into what can be done to prevent or attenuate the problems. In general, the industrial physician has not as yet developed the tools to cope with them, although the need has become evident.

DEVELOPMENT OF HUMAN RELATIONS

Although industry has only recently become concerned with the clinical aspects of emotional disorders, it has for a longer time been very much interested in utilizing human resources effectively. Early efforts included the use of industrial engineers, such as F. W. Taylor and his successors, and industrial psychologists who developed intelligence and aptitude tests for selective placement. The prevailing view was essentially mechanistic until the work of Elton Mayo and his associates who started a series of studies to determine the effects of certain working conditions on productivity.[26,27] They demonstrated that industry is not exclusively an economic venture and showed the great importance of social interaction in industry, the formation of informal groups, and the influence of such groups on morale, motivation, and ultimately on production. Since these initial investigations a variety of scientists have turned their skills to an examination of the social and psychologic aspects of work. Such scientists include social psychologists, clinical psychologists, anthropologists, and sociologists.

At present there are in the country a number of study centers at graduate level, such as those at Michigan University, Harvard University, Yale, and Cornell, devoted to the teaching and the investigation of behavioral phenomena. The scope of their interests extends beyond the industrial setting, but many of the studies are concerned with behavior problems in industry. These range through selective placement, job appraisal, work evaluation, formal and informal organization structure, communications, group interaction, morale, motivation, personality, leadership, and industrial labor strife. Initially, the investigators pursued their studies from the point of view of their own disciplines, using their own theoretical systems, techniques, and languages. Experience, however, showed an overlapping of interests and demonstrated that many of these problems yielded best to interdisciplinary studies. The academic institutions provide an appropriate setting for the exchange of concepts and techniques that have been seen in more recent years. These common efforts comprise the new discipline known as human relations.

The literary output in this field is considerable and is found in several professional journals,[28-30] in a variety of books[26, 27, 31-34] and, of particular significance, in periodicals that reach industrial management. The reports of these studies have had a great impact upon management and have probably been most responsible for an appreciation of the "human factor" and for industry's "employee-centered" orientation. This is evidenced today by the considerable demand for specialists as consultants in these problems. In addition to the research centers, which also provide services to industry, there are many private consultation agencies which offer management special assistance in response to these needs. As a group they have been highly successful in impressing upon management that special understanding and particular tools are needed to operate an organization that is both an economic and a social venture. In accounting for this success one must credit, among other things, a practical approach to recognizable, realistic problems in a way that can readily be communicated. Then, too, industry has had adequate experience in utilizing such consultants for special problems. The same has not been generally true, however, of psychiatry which has not been as successful in communicating with industry and which has several unique problems.

DEVELOPMENTS IN PSYCHIATRY

The practice of psychiatry has undergone remarkable changes in this century. Formerly, its locus was the custodial institution, a forbidding place of last refuge for many who needed to be isolated from the stressful demands of normal life and from whom the community demanded protection. The "asylum" was physically outside the community and rarely was it in the public consciousness. Any reference to it evoked feelings of anxiety, even futility. This was the atmosphere in which the psychiatrist worked, and inevitably he was identified with the stigma of the asylum. This was not a likely source of help for industry.

However, a variety of significant contributions have since profoundly changed the practice of psychiatry. Freud, his associates, and subsequent investigators developed a theoretical system for the formulation and treatment of emotional disorders. The introduction of somatic therapy and pharmacologic agents have provided valuable tools in shortening the hospitalization of patients and making them more amenable to psychotherapy. Not only are more patients being returned to community life, but it is also possible to treat as outpatients or ambulatory cases many who would formerly have been hospitalized. In addition, a multitude of people who are less severely disturbed have begun to seek help. The net result is a more hopeful attitude regarding the prognosis of mental illness and a greater confidence in the psychiatrist who has moved his practice into the community. Working beside his professional colleague in the general hospital, in various agencies, and privately, his role is more generally accepted and bears less of the old stigma. In the process the psychiatrist has developed a body of knowledge and techniques that is highly applicable to the management of the emotional disorders that confront the industrial physician.

The history of applying psychiatry's contributions in industry is brief and has been detailed elsewhere.[1, 7, 35, 36] It is significant that psychiatrists were not utilized initially to handle clinical problems. They were recruited by imaginative managements to counsel with departments of personnel in selective placement, interviewing techniques, accident prevention, and problems of morale. Of special importance for industry has been the development of social psychiatry since 1940. This discipline may be loosely defined as the application of psychiatric and sociologic principles to the study of individual and group behaviour. Actually, this definition is oversimplified and has been more fully elaborated by Rennie.[40] World War II provided the initial stimulus to the growth of this field. Psychiatrists in industry and in the armed forces were responsible for maintaining the emotional health of plant and military personnel under abnormal conditions of stress. A great deal was learned from this unusual experience about the importance of leadership, motivation, morale, and communication to production and fighting efficiency. The remarkably high number of psychiatric casualties provided an opportunity to develop techniques of emotional first-aid and to gain further insights into the varieties and mechanisms of environmental stresses producing emotional disorders. From these and subsequent studies of groups have come a number of important works dealing with a society,[41] a community,[42, 43] industries,[7, 44-47] and a mental hospi-

tal,[48] to mention only a few of a rapidly expanding literature.

Most of these investigations share a common interest in identifying and evaluating the multiple factors in the interactions of humans and their environments that culminate in emotional disturbances. Their purpose ultimately is to provide a basis for so modifying the environment or attenuating human response as to prevent or reduce the occurrence of mental illness. The basic principles and techniques very closely parallel the epidemiologic approach of occupational medicine for the prevention of disease and can be readily adapted to the machinery already available to the industrial physician.

Despite the advances in the several fields described, there has not been a great demand in industry for psychiatrists. There are several probable explanations for this. First, an aura of anxiety surrounding the psychiatrist and mental illness persists in the community, although to a lesser degree than formerly. Bringing a psychiatrist into the plant is tantamount to an admission that it is a disturbed organization. Also, the presence of a psychiatrist evokes discomfort in some industrial physicians and management personnel. Following his visit to the United States, Mindus reported in 1952 that there was still a failure in many quarters to appreciate the potential contributions pyschiatry can make to industry. There are also important practical considerations. The field is not well enough known or regarded to attract psychiatrists to its practice. Nor are there many psychiatrists with the training that is required for an understanding of industry's milieu.[49] At present there are only a handful of properly qualified psychiatrists in industry to devote an appreciable portion of their time to both the clinical and preventive aspect of emotional disorders. The preventive aspects include such activities as counselling employees, training various members of management and the medical staff, counselling management in policy formulation, advising the personnel department in selective placement practices, employee evaluation, and finally in sorely needed research.[1, 7, 50, 51]

Since psychiatrists in industry are rare, the bulk of emotional disorders are of necessity and quite appropriately the responsibility of the occupational health physician. Because of his role in the plant community he is a sensitive listening post for signs of disturbance. His record system and ready accessibility to all employees provide him with a unique apparatus to study the interactions of this environment and employees and to detect symptoms of incipient disorders. If he has the confidence of management he is also in a position to modify the environment with proper counsel. His basic functions of selective placement, environmental control, periodic health appraisal disability evaluation, health counselling and education, and first-aid treatment of nonoccupational disorders have been established.

Within this framework he must now adapt the knowledge and techniques of clinical and social psychiatry and human relations and apply them to his particular problems. He must of necessity do this, just as he must continually expand his armamentarium to solve other complicated environmental stresses such as radiations, noise and air pollution. Only in this way can he hope to maintain the health of an effective work group.

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RADIATION as an industrial medical problem*

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Radiation was an industrial health problem long before nuclear reactors and atomic bombs became a reality. So it is not exactly accurate to equate the coming of atomic energy with the introduction of radiation as an industrial health problem. It is true, of course, that only with the successful development of the nuclear reactor did the available sources of radioactivity cease to be a few curies worth and grow quickly to millions of curies. This is the reason why the radiation hazards of the nuclear age are potentially greater by orders of magnitude than in prior years and why Dr. Detlen W. Bronk, in his foreword to the 1956 NAS-NRC Summary Report "The Biological Hazards of Atomic Radiation" was justified in saying:

"The use of atomic energy is perhaps one of the few major technological developments of the past 50 years in which careful consideration of the relationship of a new technology to the needs and welfare of human beings has kept pace with its development. Almost from the very beginning of the days of the Manhattan Project careful attention has been given to the biological and medical aspects of the subject. By contrast, the automobile revolutionized our pattern of living and working, but we are only now beginning to appreciate the problems of safety, urban congestion, nervous tension, and atmospheric pollution which have accompanied its development."

Since the successful achievement of the release of nuclear energy there have been a number of persons accidentally overexposed to radiation in our atomic energy program, and two deaths are directly attributed to accidents involving radiation. Still, compared with the first large-scale uses of lead, beryllium, and aniline in industry, the record is remarkably good.

The most characteristic feature of radiation as a day-to-day industrial health problem is the long latent period which elapses between exposure or beginning exposure and the first appearance of clinical or laboratory evidence of injury. In general, the lower the exposure or the exposure rate the later the resulting injury manifests itself. Usually, years intervene before malignant change appears. Any genetic effects would appear in succeeding generations and probably be demonstrable only on a statistical basis. Acute injuries have occurred and will be a continuing threat so long as nuclear energy continues to be exploited for the benefit of society or as a weapon of war. Industrial physicians must learn how to deal with such eventualities, but in their day-to-day contact with radiation problems they will be concerned more with the prevention of over exposure to radiation and the care of the less dramatic injuries involving radiation, such as localized skin burns and wounds contaminated with radioactive materials.

Awareness that ionizing radiation was dangerous developed quite early. It is related that in 1896 a volunteer assistant of Professor Pupin at Columbia University noted erythema, itching, and desquamation of the skin of his hand following exposure to X-rays. The first knowledge of the carcinogenic action of radiation exposure appeared in 1902, only seven years after X-rays were discovered. Ionizing radiations in very large total doses, probably of the order of several thousand roentgens to the skin, were observed to have caused skin cancer. During the next two decades cases of radiation-induced

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skin cancer among physicists and radiologists appeared and were related to exposures incurred during their work as scientists, but it was not until the middle 20's that radiation was clearly established as an industrial health hazard in the usual sense of the word.

Although sporadic cases of radiation dermatitis and skin cancer had been clearly related to heavy local radiation exposure, the use of ionizing radiation to diagnose and to treat disease was not considered to be a hazard warranting the continued attention of public health officers. In 1935, however, Martland reported an outbreak of cases of osteitis, anemia, and bone cancer in young women, all employed in the watch dial industry in New Jersey. This study has become a classic in what we might now call radioepidemiology. Meanwhile it was known that in Czechoslovakia in the pitchblende mines, which had been worked for centuries for a variety of minerals, death from pulmonary disease was the rule. By 1913 it was established that a prime cause of death in these workers was lung cancer, and in 1942 it was established that the atmosphere of the mines contained considerable concentrations of radon gas, probably great enough to be the causative agent for the lung cancers.

In 1927 Muller established the fact that roentgen irradiation of the germ cells of the fruit fly resulted in gene mutations. Since then, the mutagenic effects of ionizing radiations have been repeatedly demonstrated by a number of workers in a variety of organisms including the mouse. Similarly, in the 1930's it was established that whole body irradiation in single or divided doses was leukemogenic in mice. So by 1940, except for the effects of whole-body radiation exposure on average life span, the general nature of the hazards inherent in working with radiation and radiation sources was known although poorly quantitated.

Beginning in 1929 a group which later became the National Committee on Radiation Protection and Measurement began cooperating with the International Commission on Radiological Protection in developing recommendations concerning the maximum permissible exposure of the relatively few adult workers who were then using X-ray machines and radium and, later, other sources of ionizing radiation. The recommendations were based on scientific facts obtained both experimentally in the laboratory and by observation of injuries incurred by persons in radiology and radiological physics and in the luminous dial industry. Until 1934 the levels recommended were of the order of 100 rem per year. In 1935 the National Committee on Radiation Protection recommended 30 rem per year or 0.1 rem per day. (Subsequently, as more quantitative data on the late effects of radiation accumulated these recommendations have been revised. In 1950 the recommendation was 0.3 r per week or 15 r per year, and in 1957 the average annual permissible exposure was set at 5 r.)

It is interesting to see how the picture looked at the time to those responsible for the health of the workers on the atomic bomb project.

Early in 1942 the scientists of the Metallurgical Laboratory became convinced that a nuclear chain-reacting pile could be built. They realized the enormity of the health hazards that such a unit would create. Some of them had friends or acquaintances who had been injured in experimental work with X-rays or with radium and many were aware of the harmful effects suffered by some of the workers in the radium-dial industry.

The exact nature and extent of the hazards to be encountered were not known. In general, it was realized that the pile in which the chain reaction would take place could be a far greater source of fast and slow neutrons and gamma rays than could have been dreamed possible in earlier periods. It was estimated that the pieces of uranium that would have to be removed from the pile after fission had occurred would contain materials far more radioactive than any that had been encountered in the radium industry. It appeared certain that not only the uranium but also any other material that would be removed from such a pile would be extremely active in producing alpha, beta or gamma rays. The chemical process of separating the plutonium from the other extremely radioactive elements was recognized as another tremendously hazardous procedure. The effect that plutonium itself might have on the workers was unknown.

Since no one person could have all the required knowledge or could know how to acquire it, a health group was formed which gradually evolved into an organized Health Division. The objectives of the Health Division as stated by the Laboratory Director were as follows:

1. Protection of the health of the workers on the project.
2. Protection of the public from any hazards arising from the operation of the project.
3. A study of the peculiar hazards for the purpose of being better able to establish tolerance doses, to predict more accurately what might happen in the future, to devise means of detecting ill effects to personnel, and to discover methods of treating any person who might be injured.

Dr. Robert S. Stone wrote the above. He, Dr. Stafford Warren, and Dr. Hymer Friedell were principally responsible for the medical program of the Manhattan Engineering District, wartime atomic bomb project. They enlisted the services of the best radiological physicists and industrial hygiene specialists then available in developing an extra-ordinary program of radiation protection for the workers on the project. Furthermore, they sensed the need for much more information on the biological effects of ionizing radiation and initiated a broadly conceived research program for that purpose.

This program drew on the talents of many university scientists and scientists in the government, notably from the National Cancer Institute and the National Bureau of Standards. It clearly defined the syndrome of whole-body radiation injury before it was observed in Japan in 1945 and initiated experimental studies in mice on the genetic effects of radiation, the effects of radiation on life span and the carcinogenic action of internally deposited radioactive materials. The actual scope of the health service activities by the spring of 1944 have been summarized as follows:

1. Health-service activities.
   a. Surveys of the skin for contamination with radioactive materials.
   b. Surveys of the laboratories for various types of radioactive contaminants.
   c. Metering of personnel with various types of pocket ionization chambers and film meters to determine individual exposures.
   d. Surveys of atmosphere for radioactivity.
   e. Surveys of effluent water from the Clinton pile area to determine contamination. Methods developed here will be useful at Hanford.
   f. Examinations of body secretions and excretions for radioactive materials.
   g. Clinical laboratory examinations for various types of damages to personnel exposed to either tolerance or larger doses of radiation.

This statement needs no change today as a guide to those responsible for the health of the workers and of the public in an industrial plant handling radioactive materials.

In the late 40's and early 50's more and more experimental work was done, sufficient to suggest a hypothesis that radiation levels only a little above natural background radiation or even background radiation itself have genetic effects on populations and may even be responsible for some cases of bone cancer and leukemia among the so-called normal incidence of these conditions. In June, 1956, the National Academy of Sciences and the British Medical Research Council published reports on the biological effects of radiation. These reports were stimulated by concern over the possible harmful effects of radiation from fallout from the testing of atomic weapons. Both reports concluded that any radiation exposure might exact a biological cost at least from the genetic standpoint. The reports went further and suggested that except for exposure from natural radioactivity the largest single factor in exposure to the population as a whole was medical X-rays. This has led to active efforts to reduce body and gonadal exposures from diagnostic and therapeutic X-rays. A byproduct of this concern with radiation as a health hazard was the formation in 1957 by the Department of Health, Education and Welfare of a special committee to advise the Surgeon General of the Public Health Service on radiation health matters. Thus, not only the Atomic Energy Commission, which because of its statutory responsibilities has from its inception been preoccupied with radiation health problems in its operations and since the Atomic Energy Act of 1954 in its licensing program, but other national, state, and local health agencies and such bodies as the American Standards Association have become increasingly concerned with radiation hazards. This means that each industrial medicine program in a plant which uses radiation sources of any type, even if it includes only the diagnostic X-ray machine in the plant medical office, must be cognizant of radiation as an industrial health problem. It behooves each industrial physician to become conversant with radiation medicine, the treatment of radiation accidents, and the methods of controlling radiation exposures generally, as well as to gain a more detailed knowledge concerning the particular radiation sources being used in the plant or plants for which he has the medical responsibility.

There are too many variations in the amount and kinds of radioactive material handled for any set rules to be established. Each plant will have its own special problems. In AEC operations there are nearly as many different organizational approaches to the problem as there are plants and laboratories. In many instances shortages of experts of one type or another in the various specialties have led to compromise and to placing the major share of the responsibility for radiation health protection on the man most competent to bear it, whether a physician, a radiological or health physicist, or an industrial hygiene engineer. In some instances this person reports directly to top management, in others through a medical director. The important thing is that the responsibility is clearly assigned to someone who understands radiation protection problems. The medical director must keep close contact with the program, even if he does not administer it. He must have full understanding of the types of accidents which could arise and be prepared to handle radiation injuries quickly and competently.

There is a further responsibility which the physician, or medical director, must undertake; namely, education of personnel. There is so much talk today of the hazards of radiation that lay persons frequently become unnecessarily apprehensive about them. Considerable numbers of persons are refusing to submit to important diagnostic X-ray procedures because of something they have read or heard on the radio or television. Workers who have developed confidence in those responsible for radiation protection at the plant are suddenly worried about added exposure from a routine chest X-ray film. The worker who develops a cancer of any sort may become the prey of lawyers who would claim a fee for supporting him in a suit claiming radiation exposure as the cause of his disease. Unfortunately, except for a severe radiation

burn, the chronic sequelae of which are readily recognized, none of the delayed effects of radiation is in any way specific to radiation. A radiation-induced leukemia is not identifiable as such. Nor can a radiation-induced cancer be identified any more than one induced by cigarettes. A radiation-induced mutation has no tag on it telling us that it was caused by radiation. This means that one has to speak and think of these things in terms of probability. This is a difficult concept for the layman to grasp. His experience and his habits of thought with respect to injury involve readily identifiable specific cause and specific effect relationships. Further, it is important to recognize that it is only a limited number of disease states which may be related even statistically to chronic low-level radiation exposure. Most diseases cannot be so related. The worker first turns for guidance on these matters to the industrial physician and to the family physician, who must be prepared to discuss the problem with him in simple understanding terms. The American College of Radiology has developed a very useful pamphlet which should be read by every industrial physician. It can do much to place the hazards inherent in diagnostic X-ray exposure in proper perspective.

In 1949 and 1950 the AEC established special fellowships in industrial medicine, radiological physics and industrial hygiene in order to meet the needs of its operations and to provide persons trained in radiological health matters for the expanding atomic energy industry and industrial users of radioactive materials under AEC licence. Meanwhile, the U.S. Public Health Service has established short courses in radiation health problems for health officers. Recently symposia on radiation problems have been sponsored by some state and other medical societies. These symposia are extremely useful in keeping the medical profession as a whole up to date on the problem. For a number of years the Industrial Medical Association and the American Industrial Hygiene Association have devoted whole sessions at their annual meetings to the health problems of the atomic age. It is to be hoped that more and more industrial physicians will take advantage of these opportunities to learn about radiation hazards, the methods for their control, and the therapy of injuries incurred in accidents involving radiation and radioactive materials.

Whether the future holds peace or war the number and the magnitude of sources of ionizing radiation will continue to increase and to require increasingly the attention of the industrial physician. Fortunately, on the basis of the record to date, radiation as a health problem in industry can be dealt with just as effectively as any of the other industrial hazards.

OCCUPATIONAL HEALTH (INDUSTRIAL) NURSING AS A PART OF PUBLIC HEALTH NURSING PROGRAMS*

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Planning for future programs in public health nursing will, of necessity, include occupational health (industrial) nursing if the core of the service is built on the individual and the family as integral units in the community structure. When this development occurs, new stimuli will be brought to both areas of nursing. The purpose of this paper is to identify occupational health nursing with the total public health nursing concept, to indicate the scope of occupational health services, and to suggest some areas of correlation towards closer integration of these nursing services.

IDENTIFICATION

The aim of public health nursing and occupational health nursing is to assist the individual and the family to achieve and maintain self-dependence through healthful living. Ideally, occupational health is an integral part of the total public health concept. However, the service load of the nurse in industry is apportioned differently to that of the nurse in traditional public health nursing. Besides carrying out a health education program, the nurse in industry spends a large portion of time in emergency care for occupational and non-occupational accidents and illnesses. This is compatible with a total health service because it assists the disabled employee (part of the family unit) to become rehabilitated.

In a family health program, the public health nurse in the community gives service to those members of the family reached through home visiting, the schools, and clinics of the community. The occupational health nurse, on the other hand, gives service to the gainfully employed members of the family unit at their place of work (employment). There are, nevertheless, many areas where the two services work together; these can be strengthened. There also are gaps which will be closed where public health administration is planned on the concept of the community as an overall entity or as a "whole".

The scope of occupational health service is outlined here as concisely as possible. The nurse functions within the industry's health program according to the Nurse Practice Act. Each nurse should have medical guidance to function at her full nursing capacity. This medical guidance will be on a part-time basis in the smaller units and on a full-time basis in large employment situations. In some areas of nursing administration in industry, the nurse receives guidance from a senior member of management. Where there are industrial relations departments, the co-operation of the management-doctor-nurse team is indeed of a high order and can be a stimulus for total community health program.

THE SCOPE OF OCCUPATIONAL HEALTH SERVICES

I. Physical Examinations
   The nurse assists in —
   (1) Preplacement — for assessment of the individual and his work capacity
   (2) Periodic —
      (a) Exposure to toxic materials and other hazards.
      (b) Examinations of executives and others.
   (3) Special —
      (a) Termination of employment (pension) and other health reasons.
      (b) Return-to-work following illness or injury.

II. Health Education and Counselling
   (1) Health Education —
      (a) Individual
      (b) Group
      Health education is incorporated into all phases of the industry's health program and is correlated with the community health program.
   (2) Counselling — This, of necessity, is on a limited basis in a one-nurse industrial health service. In larger staffs, time and facilities lend themselves more readily to a true counselling situation.

III. Care and Treatment for Illness and Injuries
   (1) Emergency care at the place of employment for medical and surgical conditions.
   (2) Subsequent care and treatment at work for the above.
   (3) Follow-up health guidance to hospitals and homes may be done through home visiting or through the co-operation of community nursing services.

IV. Participation in Plant Safety, Sanitation, and Welfare Activities. Such as Health and Sickness Insurance Plans, Nutrition Services.
   The nurse does not have authority or disciplinary powers in relation to the above, but she applies health principles and teaching in a co-operative manner.

* Working Paper No. 26, World Health Organization, Expert Committee on Public Health Nursing, 1958.

V. Co-ordination with Community and Health and Welfare Agencies.

(1) Maintains working relationships with community physicians and public health personnel.

(2) Assists community agencies to become informed of the company's health facilities and services such as health and welfare plans, industrial relations re hours of work and other policies related to the well-being of the worker and his family.

(3) Keeps management and employees informed of methods of coordination with community health services, such as

Family physicians
Medical specialists
Hospital facilities and personnel, especially emergency and outpatient departments.
Dentists
Chest survey services
Immunization services
Mental health services
Child health agencies
Family welfare and social agencies
Rehabilitation services
Geriatric services
Safety Councils and their programs.

VI. Administration of Health Services within Industry. General administration including records and reports, interpretation of the services and other public relations activities. The role of the nurse in an occupational health service requires well-defined personnel policies and procedures to clarify and conserve her services as a professional person.

SOME TRENDS LEADING TO CLOSER CORRELATION OF HEALTH SERVICES IN THE COMMUNITY

1. Public health administration has for some years attempted to plan its services on the family as a unit, and to the community as an entity. This has been accomplished "in principle". There are indications in health literature that it may soon become a reality. When this occurs, public health programs will include occupational health or health services to the adult members of the family gainfully employed outside the home. To accomplish this, there will be among the health personnel a nurse or nurses to co-ordinate the services of the nurses in industry with those working in the community.

   One such project is in effect in Canada. It is known as the Kitchener-Waterloo Small Plant Project, which has among its health personnel a member of the nursing supervisory group of the city's health staff who co-ordinates the services of the occupational health nurses with the community health program. It is considered a successful project.

2. Where occupational health is incorporated into the public health administration program, the members of industrial management will be included in the planning of community health services. This will create new interests and new perspective for health and welfare personnel. One new point of view from industrial management, I am sure, would be the greater emphasis on self-help, or to help the individual and his family to assume more responsibility for their own health, and to make more intelligent use of community resources than is the custom at present. In health programs (including care of the sick), it is a case of a "few caring for the many". There will need to be a change of emphasis towards more self-help by each person if the demands for health services are to be met. Industrial or occupational health can lead the way in this area.

3. In some communities the health department includes the industrial nurses in their nursing conferences. This is especially valuable in smaller communities which may have one main industry (but not a so-called "company town"). The nurse in industry working alone appreciates the stimulus of meeting with other nurses and participating in community health discussions.

PREPARATION FOR OCCUPATIONAL HEALTH NURSING

At present, public health nursing preparation emphasizes as its core theme the family as a unit. To include preparation for occupational health nursing, more space in the curriculum will need to be allocated for the consideration of services to the adult members of the family. It will also include some understanding of industrial relations, legislation, human relations at work, etc. Occupational health nursing needs a nurse with public health preparation and community health experience. Add to this skill and judgment in medical and surgical nursing, a knowledge of labour legislation including Workmen's Compensation, safety and health principles and practices in the work environment.

On the senior level, there is need for further preparation for supervision, administration, and consultation to improve standards, and to interpret the role of the nurse in occupational health which in my experience, I believe, is on the eve of a great expansion.

Plans in the near future should include leadership in public health nursing which will integrate occupational health nursing into the total public health administration fabric.

LIVING AND WORKING WITH HEART DISEASE*

BY LEONARD J. GOLDWATER, M.D.

The purpose of this paper is to summarize the results of a series of studies which were started in 1941 and have been continued up to the present time. All of these studies deal with the occupational potentialities of persons who have heart disease. The term "cardiac rehabilitation" has been applied to this work although this may be something of a misnomer.

The fact that physical impairments of one sort or another may result in employment problems has been appreciated for many years. Formal recognition of the employment problems of cardiacs dates back at least to 1913, at which time there was established in New York City a Trade School for Cardiac Convalescents[1]. Unfortunately this venture had a life of only three years, so that any long term follow-up of patients was precluded. An Employment Bureau for the Handicapped was operated by the Hospital Social Service Association of New York City from 1918 to 1922. During that period approximately one thousand cardiacs were placed in regular industry and a few of these were followed for about a year. They are described as having responded favourably.

Between 1920 and 1940 a number of articles appeared in the medical literature dealing with the rehabilitation or placement of cardiacs in industry. These articles are summarized in a paper published in 1956[2]. One or two of these contain follow-up data for as long as five years, but in general long range observation was somewhat limited.

In 1941 there was established at Bellevue Hospital in New York the first Cardiac Work Classification Unit. The primary purposes of this Unit were:

1. To assist in solving the employment problems of cardiacs.
2. To develop methods whereby this could be done most effectively.
3. To study the effects of employment on the course of heart disease.
4. To study the effects of heart disease on ability to work.

It was anticipated that a period of twenty years might be required to achieve these objectives. As a matter of fact the Bellevue Work Classification Unit voluntarily closed its doors after 15 years of operation since it was felt at that time that the original purposes had been accomplished. Some of the more significant findings form the basis for this paper. Passing mention may be made of the fact that at least fifty Cardiac Work Classification Units, modelled after the Bellevue Unit, are now functioning across the country, and additional Units are constantly being organized. At the present time consideration is being given to starting such a program here in Vermont.

EARLY STUDIES

In order to obtain background information an occupational analysis was carried out covering 2,081 patients who were attending cardiac clinics in New York in 1941. Since the subjects studied were clinic patients, and

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hence represented a segment of the population with low income, no generalized conclusions could be drawn from this analysis. It was possible, however, to obtain a certain amount of useful information, details of which were published in 1944[3].

The clinic patients whose records were analyzed were divided almost evenly between males and females. All age groups, all important etiological types and all degrees of severity of heart disease were represented in substantial numbers. The major findings of this study were:

1. Of the males, 47 per cent were working.
2. Of the females, 84 per cent were working.
3. The types of occupation included professional, clerical, skilled, semi-skilled and unskilled work.
4. Among the females who were working, 78 per cent were doing housework. A detailed analysis of this group showed that most of them were doing what for a woman would be described as heavy work. As a result of these findings, at least one conclusion seemed justified, namely, that a fairly large proportion of cardiacs can work and actually *do* work.

The study just described represents a superficial analysis of a group of cardiac patients and their occupational status at a single point of time. It throws no light on the effects of employment on the course of heart disease. Subsequent studies were designed to remedy this deficiency[4,5,6].

In order to study the effects of employment on the course of heart disease and the effects of heart disease on ability to work, it is necessary to have occupational data and medical data for the same group of patients covering many years. If it were possible to compare a number of working cardiacs with a similar number of non-working patients, the value of the studies would be greatly enhanced. Such an experimental procedure, however, offers almost insuperable difficulties. Rarely is it possible to perform the same kind of matching of control and experimental subjects that is done in other types of clinical or laboratory research.

In spite of the built-in difficulties and limitations, the staff of the Bellevue Work Classification Unit undertook a detailed analysis of the medical and occupational histories of 580 cardiac clinic patients, many of whom had been under observation for more than 15 years. The study group included only those who were living and in active clinic attendance in 1949, but it embraced both working and non-working patients. Obviously analysis of such a biased sample must be interpreted with caution, nevertheless a good deal of significant information was obtained. Some of the major observations were:

1. The ability of many cardiacs to work received further confirmation.
2. Occupational activity does not necessarily lead to progression of heart disease.
3. A substantial number of cardiacs show improvement while in an employed status.
4. Many cardiacs can return to their original jobs following such cardiovascular episodes as a myocardial infarction, congestive failure, rheumatic activity, auricular fibrillation or severe angina.
5. Episodes of the type just listed may not be any more frequent in the employed than in the unemployed cardiac.

As a general conclusion it can be stated that these analyses revealed no evidence that employment per se has any adverse effect on the course of heart disease and that heart disease does not necessarily impose any serious limitations on ability to work.

SPECIAL STUDIES

THE OLDER CARDIAC PATIENT

In view of the fact that increasing age generally results in greater employment problems, a special study of cardiacs over the age of 55 years was undertaken. Detailed results of this study were published in 1953[7].

Analyses were made of 236 patients who were 55 years old or older at the time when heart disease was originally diagnosed. As might have been anticipated, the employment experience of these individuals was less favorable than that of younger cardiacs. Part of the difficulty was due to the fact that the cardiac functional capacity of patients whose heart disease develops after age 55 is usually initially diminished to a greater degree than is the case in younger persons. A second difficulty lies in the fact that employment opportunities in general are somewhat restricted for the elderly.

In spite of the difficulties experienced by these older cardiacs, it was found that among the 236 patients, 36 per cent were employed full time and an additional 21 per cent part time. The jobs which they held varied from professional to unskilled work. As was the case with cardiacs in general, there was no evidence found in this study to indicate that continued employment had any adverse effect on the course of heart disease.

CONGESTIVE HEART FAILURE

In the course of the studies mentioned above it had been observed that many patients with severe heart disease had been able to continue in employment. Among the important factors were the will to work, and the application of suitable therapy. When the former exists within the patient and the latter is applied, even the presence of congestive failure is not incompatible with full time work. A small group of patients who continued to work in spite of the presence of congestive heart failure was reported on in 1957,[8] and a much larger group is now being studied. Strong motivation to work has been found to be a common denominator in all of these patients, but this alone would not be sufficient. The availability of modern therapeutic measures including cardiac surgery, salt restriction and organomercurial

diuretics (parenteral and oral) has played an important role along with digitalis, quinidine and ammonium chloride.

MISTAKEN DIAGNOSES

It has been said in connection with medical diagnosis that it is usually quite easy to recognize what is abnormal but often very difficult to recognize what is normal. This was certainly borne out by observations made at the Bellevue Work Classification Unit. All patients seen at the Unit were referred because of employment difficulties that were attributed to heart disease, but of the first 631 cases studied some 28 per cent were found not to have heart disease. A detailed analysis of this group was published in 1952 in an article entitled "A study of one hundred seventy-five 'Cardiacs' without heart disease."[9] It was apparent from this study that most of the errors could have been avoided if the examiner had used accepted diagnostic criteria such as those promulgated by the New York Heart Association. Among the lessons learned from this study was that before any attempt is made to adjust an individual's work situation to the capacities of a damaged heart it is well to be certain that heart disease actually is present.

DIFFICULT CASES

The tone of this review up to this point has been one of optimism. As a matter of fact there is ample reason for optimism as far as the occupational potentialities of many cardiacs are concerned. There are some, however, for whom the possibility of substantial gainful employment is extremely limited. No special study was made of those in the difficult group, but a number of relevant factors emerged in the course of other analyses. Some of these factors have already been mentioned. A more complete list includes the following:

1. Older age.
2. Lack of motivation.
3. Lack of education, skill or aptitude.
4. Limited employment opportunities in the labor market.
5. Fear on the part of the patient, his family, his doctor or a prospective employer.
6. Legal litigation.
7. Difficulties in travel.
8. Deficiencies in medical knowledge.

Age as an obstacle to employment was mentioned above. The existence of heart disease in an older person certainly does not enhance his possibilities. In some communities there may be a sheltered workshop for those who cannot find regular employment, but such facilities are limited. Vocational re-training may be advisable in a few cases, but should be undertaken only if there is reasonably good chance of a job being available.

Cardiacs whose physical condition would permit full time or regular employment, but who lack the will to work frequently need psychiatric help. The difficulty often rests on an underlying emotional disturbance or some other form of psychological maladjustment. They are indeed difficult cases since many of them appear not to want to be helped.

Individuals with limited education and without skills or aptitudes always offer employment problems. When heart disease is super-imposed the situation becomes more difficult and when advanced age is also present it becomes practically hopeless. A scarcity of labor, such as existed from 1941 to 1945, may create employment opportunities for those who otherwise would not be hired, but when the labor market is normal or over-supplied the outlook for the unskilled cardiac is pretty dim.

The element of fear as an obstacle to employment is of major importance. Fear on the part of a patient that dire consequences may follow resumption of employment can be more disabling than the underlying lesion in the heart. Over-protective families often aggravate the situation and the over-cautious physician does little to help. The only hope lies in the education of all concerned. The existence or threat of legal litigation, either in workmen's compensation, negligence actions or in relation to insurance benefits not infrequently result in unduly prolonged periods of occupational idleness. Zealous lawyers may not always realize that physical and psychological damage resulting from prolonged legal proceedings may far outweigh any financial benefits the patient receives.

In many communities, travel between home and place of work calls for an expenditure of energy which exceeds that demanded by the job itself. The ultimate solution of this particular problem lies in over-all community planning.

A good deal of valuable information has been developed during the past few years as to the effects of employment on the course of heart disease, but much still remains to be learned. Long range follow-up studies of a controlled type are still needed. Another important gap in knowledge is found in the field of tests for physical capacity to work. There is still no practical and reliable method of measuring objectively a patient's ability to meet the physical demands of a specific job.

CONCLUSIONS

For the cardiac who wants to work, the outlook today is far brighter than it was a decade ago. Strong evidence is now available that most persons with heart disease who are intelligently placed and who remain under medical supervision can look forward to many years of gainful employment. The outlook for them is certainly no worse, and is probably better than it would be if employment were to be terminated.

Medical research is constantly adding to the knowledge available to physicians and at the same time forcing the modification or rejection of older beliefs. It is now definitely known that the time-honored advice to cardiacs to "take it easy" may do more harm than good.

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